

What is claimed is:

- 1 1. An ultrasonic pen comprising:  
2 a pressure sensitive tip to generate a pressure signal;  
3 an ultrasonic transmitter to transmit pulses for position determination; and  
4 a second transmitter to transmit the pressure signal.
- 1 2. The ultrasonic pen of claim 1 wherein the pressure sensitive tip includes an  
2 ink dispenser.
- 1 3. The ultrasonic pen of claim 1 wherein the ultrasonic transmitter and the  
2 second transmitter emit energy at different frequencies.
- 1 4. The ultrasonic pen of claim 3 wherein the ultrasonic transmitter emits  
2 ultrasonic energy between substantially forty kilohertz and eighty kilohertz.
- 1 5. The ultrasonic pen of claim 1 further comprising a pressure activated switch  
2 coupled to a first end of the pen, wherein the pressure activated switch is operable to  
3 turn on the ultrasonic transmitter when pressure is applied to the first end of the pen.
- 1 6. The ultrasonic pen of claim 5 wherein the ultrasonic transmitter comprises a  
2 piezoelectric material.
- 1 7. The ultrasonic pen of claim 6 wherein the piezoelectric material is arranged in  
2 a cylinder.
- 1 8. The ultrasonic pen of claim 1 wherein the second transmitter comprises an  
2 infrared transmitter.

1 9. The ultrasonic pen of claim 8 wherein the second transmitter is configured to  
2 provide a time reference signal.

1 10. The ultrasonic pen of claim 1 wherein the second transmitter comprises a  
2 radio frequency transmitter.

1 11. The ultrasonic pen of claim 1 wherein the ultrasonic transmitter and the  
2 second transmitter are burst transmitters.

1 12. A digital signature collection system comprising:  
2 a first ultrasonic receiver;  
3 a second ultrasonic receiver mountable on a surface a distance from the first  
4 ultrasonic receiver;  
5 a higher frequency receiver; and  
6 an ultrasonic pen having an pressure sensitive ink cartridge to dispense ink  
7 and to generate a pressure signal, the ultrasonic pen being configured to transmit the  
8 pressure signal to the higher frequency receiver, and to transmit ultrasonic energy to  
9 the first and second ultrasonic receivers.

1 13. The digital signature collection system of claim 12 further comprising a  
2 computer coupled to the first and second ultrasonic receivers and the higher  
3 frequency receiver.

1 14. The digital signature collection system of claim 13 wherein the computer is  
2 configured to receive time-of-arrival data from the first and second ultrasonic  
3 receivers, and configured to receive pressure signal information from the higher  
4 frequency receiver.

1 15. The digital signature collection system of claim 14 wherein the computer is  
2 further configured to determine a location of the ultrasonic pen versus time, a

3 velocity of the ultrasonic pen versus time, and an acceleration of the ultrasonic pen  
4 versus time.

1 16. The digital signature collection system of claim 12 wherein the higher  
2 frequency receiver comprises an infrared receiver.

1 17. The digital signature collection system of claim 12 wherein the higher  
2 frequency receiver comprises a radio frequency receiver.

1 18. A method of operating a digital signature collection system comprising:  
2 receiving ultrasonic energy at a plurality of ultrasonic receivers;  
3 receiving pressure information at a higher frequency receiver;  
4 determining a location of an ultrasonic transmitter versus time, from the  
5 ultrasonic energy to determine a signature shape;  
6 determining an applied pressure versus time, from the pressure information;  
7 and  
8 preparing the signature shape and the applied pressure for comparison with a  
9 reference.

1 19. The method of claim 18 wherein preparing for comparison comprises  
2 encrypting.

1 20. The method of claim 18 further comprising determining velocity of the  
2 ultrasonic transmitter versus time, from the ultrasonic energy.

1 21. The method of claim 18 further comprising determining acceleration of the  
2 ultrasonic transmitter versus time, from the ultrasonic energy.

1 22. The method of claim 21 wherein preparing comprises:  
2 encrypting the signature shape, the applied pressure, and the acceleration into  
3 a packet; and  
4 sending the packet to a processor for comparison with a reference signature  
5 that includes signature shape, applied pressure, and acceleration.

1 23. The method of claim 22 wherein preparing further comprises combining an  
2 IP address in the packet.

1 24. The method of claim 22 wherein preparing further comprises combining a  
2 phone number in the packet.

1 25. An article having a machine-readable medium, the machine-readable medium  
2 having instructions stored thereon for a method comprising:  
3 determining the location of an ultrasonic transmitter versus time, from  
4 information received from a plurality of ultrasonic receivers; and  
5 determining applied pressure versus time, of pressure applied to the ultrasonic  
6 transmitter from information received by a higher frequency transmitter.

1 26. The article of claim 25 wherein the method further comprises:  
2 determining velocity of the ultrasonic transmitter versus time, from the  
3 information received from the plurality of ultrasonic receivers.

1 27. The article of claim 25 wherein the method further comprises:  
2 encrypting the location, the pressure, and the velocity into a packet; and  
3 sending the packet to a processor for comparison with a reference that  
4 includes location, pressure, and velocity.

1 28. The article of claim 27 wherein the method further comprises encrypting  
2 location information into the packet.

